General

Title

Overuse of imaging: ratio of the number of MRI scans to the number of CT scans obtained on or within the 30 days after the date of evaluation for atraumatic headache for children, ages 4 through 17 years old, within the measurement year.

Source(s)

Quality Measurement, Evaluation, Testing, Review and Implementation Consortium (Q-METRIC). Basic measure information: ratio of magnetic resonance imaging scans to computed tomography scans for the evaluation of children with atraumatic headache. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2016 Jan. 57 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Process

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the ratio of the number of magnetic resonance imaging (MRI) scans to the number of computed tomography (CT) scans obtained on or within the 30 days after the date of evaluation for atraumatic headache for children, ages 4 through 17 years old, within the measurement year.

A higher ratio of MRI to CT scans indicates better performance, as reflected by a smaller number of children being exposed to radiation as a result of neuroimaging.

Rationale

Headaches are common in the pediatric population (Lateef et al., "Headache in a national," 2009), and

children with headaches are frequently evaluated in emergency departments and primary care settings (DeVries et al., 2013; National Hospital Ambulatory Medical Care Survey, 2011). Although most headaches are not symptomatic of underlying disease, the differential diagnosis list for headache is long, with over 300 different types and causes (Evans, 1996). Headaches are divided into two main classifications: primary headaches, such as migraine or tension headaches, and secondary headaches, which include headaches attributed to a separate condition, such as infection, trauma, tumors, or vascular problems (International Headache Society [IHS], 2014). For the purposes of this measure, atraumatic headaches are considered to be primary headaches or secondary headaches unrelated to injury.

Computed tomography (CT) and magnetic resonance (MR) of the brain are the neuroimaging modalities at the center of this overuse measure. Both are radiologic modalities used to create images of internal structures in a slice-by-slice manner. CT uses X-ray radiation (hereafter simply called radiation), and MR uses magnetic fields and radio waves. CT scans are simple to order because the technology is readily available (Ginde et al., 2008), fast, and less expensive to perform than magnetic resonance imaging (MRI). MRI, however, has advantages for the assessment of children with atraumatic headache, because it does not involve radiation and offers better spatial resolution for identifying structural causes of headaches. This measure is focused on the overuse of CT in the setting of headache, a problem that has gained national attention in recent years (Loder et al., 2013). Overuse has been defined as any patient who undergoes a procedure or test for an inappropriate indication (Lawson et al., 2012).

While there are valid reasons for obtaining neuroimaging to characterize atraumatic headaches—specifically when concern exists regarding an underlying condition such as an arteriovenous malformation or tumor—in general, the yield of neuroimaging in the evaluation of patients with headache and a normal neurologic examination is quite low (Hayes et al., 2012; Chu & Shinnar, 1992; Evans, 1996; Gandhi et al., 2015; Lateef et al., "Headache in young," 2009; Lateef et al., 2012). Yet, neuroimaging is increasingly used to evaluate for structural abnormalities of the brain in pediatric patients who experience headache (Broder, Fordham, & Warshauer, 2007; Graf et al., 2008; Larson et al., 2011). Such neuroimaging studies rarely result in a change in care management, suggesting overuse in the evaluation of children who have experienced an atraumatic headache (Lateef et al., "Headache in young," 2009). In its guidelines for imaging children with secondary headaches accompanied by neurological signs or symptoms of increased intracranial pressure, the American College of Radiology (ACR) recommends MRI; CT is suggested as an alternative in instances where MRI is unavailable or problems with sedation arise (Hayes et al., 2012).

Imaging overuse subjects children to a number of risks (Malviya et al., 2000; Mathews et al., 2013; Pearce et al., 2012; Wachtel, Dexter, & Dow, 2009). Children who undergo CT scans in early life tend to be at greater risk for developing leukemia, primary brain tumors, and other malignancies later in life (Mathews et al., 2013; Pearce et al., 2012). Children are also at risk for complications from sedation or anesthesia, which are often required for MRI and longer CT imaging sequences. These complications include compromised airway, hypoxia leading to central nervous system injury, and death. Additionally, overuse of imaging creates cost burdens for the patient, as well as for payers. Providers should carefully consider the risks and benefits of neuroimaging before ordering. The overuse of CT imaging when MRI is a reasonable alternative for the characterization of atraumatic headache is the central focus of this measure.

Evidence for Rationale

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Primary Health Components

Atraumatic headache; computed tomography (CT); magnetic resonance imaging (MRI); overuse; children

Denominator Description

The denominator is the number of computed tomography (CT) scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year. See the related "Denominator Inclusions/Exclusions" field.

Numerator Description

The numerator is the number of magnetic resonance imaging (MRI) scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year. See the related "Numerator Inclusions/Exclusions" field.

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

A formal consensus procedure, involving experts in relevant clinical, methodological, public health and organizational sciences

A systematic review of the clinical research literature (e.g., Cochrane Review)

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Atraumatic Headache Prevalence and Incidence
Headaches are common in the pediatric population (Lateef et al., 2009), and children with headaches are frequently evaluated in emergency departments and primary care settings (DeVries et al., 2013; National Hospital Ambulatory Medical Care Survey, 2011). Headaches occur more often as children grow older

(Hayes et al., 2012). At age 7 years, prevalence ranges from 37% to 51%. By age 15 years, 57% to 82% of children have experienced headaches. And among 16-year-olds, 93% or more have reported experiencing a severe headache (Hayes et al., 2012). Before puberty, boys are more likely than girls to experience headache. The situation is reversed after puberty, when headaches are more commonly reported in girls (Hayes et al., 2012).

Atraumatic Headache Pathology and Severity

Headaches can be classified as either primary (not a symptom of an underlying disease, condition or trauma) or secondary (related to an existing issue). Examples of primary headaches include migraine and tension headaches. Examples of secondary headaches include headaches associated with dehydration, sinusitis, tumor, and vascular malformations. For the purposes of this measure, atraumatic headaches are considered to be primary headaches or secondary headaches unrelated to injury.

The precise pathophysiology of headaches is still not fully understood, but research suggests that complex interactions between the neural and vascular systems are involved (Edvinsson, 2001). The manifestation and perception of headache is unique and specific to the child who experiences it. Correspondingly, the management approach for children with headaches often focuses on reassurance and education by the clinician who evaluates the child (Brna & Dooley, 2006; Raieli et al., 2010).

Burdens of Using Computed Tomography (CT) Instead of Magnetic Resonance Imaging (MRI) for Characterization of Atraumatic Headache: Radiation, Sedation/Anesthesia, and Intravenous Contrast Risks; Cost

MRI is generally preferred to CT because of its superior resolution, versatility, and lack of radiation dose (Hayes et al., 2012; Gaillard et al., 2011). An MRI for optimally resolving neurologic structures takes approximately 30 minutes or more to accomplish and will often require sedation to successfully image younger children. CT can be favored in some situations, for example, when imaging must be obtained emergently or there is concern for intracranial hemorrhage.

The literature offers many examples of the potential risks associated with overuse of imaging. Chief among these are risks related to radiation (Mathews et al., 2013; Pearce et al., 2012), sedation and/or anesthesia (Malviya et al., 2000; Wachtel, Dexter, & Dow, 2009), and intravenous contrast media (Zo'o et al., 2011).

Radiation-Related Burden and Risk. Radiation exposure associated with CT-imaging introduces the possibility of chronic health risks related to malignancies sustained from radiation effects (Berrington de González et al., 2009; Mathews et al., 2013; Pearce et al., 2012). Radiosensitive organs including the brain, bone marrow, lens of the eye, and thyroid gland can be exposed to radiation during CT of the head (Papadakis et al., 2011). In children younger than 5 years, about 20% of the active bone marrow is in the cranium, compared with 8% in adults (Cristy, 1981). CT-based radiation dose for pediatric patients is highly problematic because developing cellular structures and tissues of children are significantly more radiosensitive than those of adults; children, therefore, will be at substantially elevated risk for malignancy (Hayes et al., 2012).

To conduct imaging studies with radiation dosing that is appropriate for children, many facilities follow policies and protocols using the concept of ALARA—as low as reasonably achievable. ALARA principles deem any additional radiation beyond the minimum needed for interpretable images both detrimental and non-efficacious (American College of Radiology [ACR], 2009). Professional practice and patient advocacy groups, including the ACR, the American Academy of Neurology (AAN), and the American Academy of Pediatrics (AAP), have developed and promoted ALARA protocols and policies. These guidelines support the use of CT imaging only when clinically indicated in children, decreasing the risk of harm from radiation.

Sedation- and Anesthesia-Related Burden and Risk. Some children will require sedation to ensure minimal movement during CT and MRI studies. Use of sedation is necessary to avoid motion artifacts, which invariably occur if the child moves during the image acquisition, thus interfering with image quality. Motion artifacts sometimes undermine imaging quality to the point of rendering images unreadable. In the case of CT imaging, this may result in additional radiation exposure to obtain images sufficient for

interpretation. Although the sedation used for pediatric imaging has been identified as low risk, it does have potential attendant complications (Cravero et al., 2006; Malviya et al., 2000). Levels of sedation are on a continuum from minimal anxiolysis (administration of an anxiety reduction agent) to deep sedation, in which the patient can be roused only via vigorous stimuli (Arthurs & Sury, 2013). Compared with minimal sedation, moderate and deep sedation carry a greater risk of airway compromise, hypoxia resulting in central nervous system injury, and death (Cravero et al., 2006).

In certain instances, sedation may not be sufficient, and anesthesia will be required to complete imaging. Anesthesia includes administration of medication that results in some degree of respiratory suppression and potential for cardiac depression; the patient cannot be roused by external stimuli or commands (Arthurs & Sury, 2013). Administration of anesthesia raises risks related to the process of intubation for respiratory support. These risks include dental trauma; airway edema (swelling of the windpipe); vocal cord spasm or injury; regurgitation of stomach contents with subsequent aspiration (inhalation) pneumonia; injury to arteries, veins, or nerves; alterations in blood pressure; and/or irregular heart rhythms (Society for Pediatric Anesthesia, 2014). The most severe risks, though rare, include brain damage and death (Society for Pediatric Anesthesia, 2014).

Intravenous Contrast-Related Burden and Risk. During the course of CT and MRI studies, intravenous (IV) contrast media may be used to enhance visualization of vascular structures and provide important information about neurologic anatomy. It is possible the child may experience an allergic reaction to IV contrast or subcutaneous fluid leakage (extravasation) during administration of IV contrast. IV contrast administration also includes the risk of contrast-induced nephrotoxicity (CIN) (Bansal et al., 2014; Zo'o et al. 2011). Children with poor kidney function are at greater risk for developing CIN and, in rare cases, will develop renal failure requiring dialysis.

Cost-Related Burden. Overuse of imaging is costly and places additional strain on an already heavily burdened health care system (Callaghan et al., 2014). As an example, charges for a CT scan of the head can be as much as $2,000 and can vary substantially by region of the country. In addition, the likelihood that neuroimaging will result in the identification of clinically important structural abnormalities in this patient population is low. Incidental findings, however, may require follow-up testing with associated charges and potential complications (Lumbreras, Donat, & Hernández-Aguado, 2010; Rogers et al., 2013).

Performance Gap

Currently, professional guidelines do not support neuroimaging for atraumatic headache in the absence of documented neurologic signs or symptoms that suggest increased intracranial pressure or persistent neurological deficits. While many children with headaches will not benefit from neuroimaging, children experiencing secondary headaches associated with trauma, new neurologic deficits, or signs and symptoms of increased intracranial pressure may require timely imaging. CT is usually the initial imaging modality of choice for patients who require timely imaging in the acute clinical setting or when intracranial hemorrhage is a concern (Hayes et al., 2012). CT imaging is readily available in most emergency departments (Ginde et al., 2008).

The ACR Appropriateness Criteria (Hayes et al., 2012) rank MRI as more appropriate than CT in patients with atraumatic headache. MRI will usually be the preferred modality instead of CT, because MRI does not use radiation and tends to have improved spatial resolution. Even for the evaluation of time-sensitive conditions such as failure of a ventricular-peritoneal shunt, MRI may be a reasonable alternative to CT for children with atraumatic headaches (Boyle et al., 2014; Kim et al., 2015).

Drivers of Overuse

Atraumatic headache experienced by a child, especially when recurrent, can be a stressful event that may prompt a parent to seek the assistance of a health care provider, at times emergently. Some providers may feel pressured by the parent to order imaging despite the lack of benefit (Daymont et al., 2014; Raieli et al., 2010). This circumstance has a close parallel to parents who seek out antibiotics for a child who has viral respiratory symptoms. In these circumstances, the provider may deviate from established practice guidelines to placate the parent. In recent decades, this phenomenon has reached such wide-spread prominence as to prompt multidisciplinary initiatives targeted at fostering discussion and identifying common practices that should be questioned by parents and providers (AAP, 2013). An

ongoing dialogue between providers and parents regarding the risks and benefits of neuroimaging for the evaluation of children who experience an atraumatic headache is a key feature of avoiding overuse.

The practice of defensive medicine is another reason an imaging study may be ordered. Physicians may be uncomfortable facing uncertainty regarding the etiology of headache in children they are evaluating and treating. Assurance behaviors (e.g., ordering of additional tests) are expected when a malpractice-sensitive physician is faced with a potentially worrisome condition (e.g., a brain tumor) that can cause the symptom in question (e.g., a headache) (Carrier et al., 2013). In a survey of physicians from six specialties at high risk of liability, emergency physicians ordered more unnecessary diagnostic tests than clinicians from any other specialty (Studdert, et al. 2005). Physicians practicing in the emergency department have the added challenge of limited access to detailed medical records, which increases uncertainty about prior evaluation of patients who are referred from an out-of-network provider or hospital. Overuse of neuroimaging is a potential result.

See the original measure documentation for additional evidence supporting the measure.

Evidence for Additional Information Supporting Need for the Measure

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Extent of Measure Testing

Reliability

To evaluate the reliability of using administrative claims for the calculation of this measure, a signal-to-noise analysis was conducted. This analysis was focused on assessing the ability to confidently distinguish the performance of one state health plan from that of another state. To perform the signal-to-noise analysis, the Medicaid Analytic eXtract (MAX) administrative claims data provided by the Centers for Medicare & Medicaid Services (CMS) from 2006 to 2010 for seven state Medicaid programs were used: Colorado, Florida, Illinois, Massachusetts, Michigan, Texas, and Utah. The number of magnetic resonance imaging (MRI) and computed tomography (CT) scans per state and year are summarized in Table 7 of the original measure documentation. Ratios varied between states, ranging from a low of 0.25 in Illinois (2007) to a high of 0.67 in Utah (2009, 2010). Lowest to highest ratios of MR to CT imaging within each state across the 5-year period were as follows: Colorado (0.33 vs. 0.47), Florida (0.44 vs. 0.54), Illinois (0.25 vs. 0.31), Massachusetts (0.50 vs. 0.60), Michigan (0.30 vs. 0.49), Texas (0.37 vs. 0.40), and Utah (0.34 vs. 0.67).

For this approach, reliability was estimated with a beta-binomial model (RAND Corporation, TR-653-NCQA, 2009). This approach is applicable in instances where the numerator is a subset of the denominator; for reliability testing, the numerator was defined as the number of MRIs and the denominator was defined as (number of CTs + number of MRIs). The reliability was tested using aggregate data from these seven states, 2006 to 2010.

Reliability Results. Reliability results are detailed in Table 8 of the original measure documentation.

These results show that the reliability based on signal-to-noise analysis ranged from 0.90 to 1.00 with a median of 0.99.

Reliability Conclusions. The reliability is very good; observed reliability was consistently greater than 0.90. In general, reliability scores can range from 0.0 (all variation is attributable to measurement error) to 1.0 (all variation is caused by real differences). While there is not a clear cut-off for a minimum reliability level, values above 0.7 are considered sufficient to distinguish differences between some health plans and the mean; reliability values above 0.9 are considered sufficient to see differences between health plans (RAND Corporation, TR-653-NCQA, 2009). The median reliability observed across state Medicaid programs tested for this measure was 0.99 (range: 0.90-1.00), which is consistent with a high degree of reliability.

Validity
The face validity of this measure concept was established by a national panel of experts and parent representatives for families of children with headaches and seizures convened by the Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). The Q-METRIC panel included nationally recognized experts in the area of imaging children, representing general pediatrics, pediatric radiology, pediatric neurology, pediatric neurosurgery, pediatric emergency medicine, general emergency medicine, and family medicine. In addition, face validity of this measure concept was considered by experts in state Medicaid program operations, health plan quality measurement, health informatics, and health care quality measurement. In total, the Q-METRIC imaging panel included 15 experts, providing a comprehensive perspective on imaging children and the measurement of quality metrics for states and health plans.

The Q-METRIC expert panel concluded that this measure concept has a high degree of face validity through a detailed review of concepts and metrics considered to be essential to appropriately imaging children. Concepts and draft measures were rated by this group for their relative importance. This measure received an average score of 6.7 (with 9 as the highest possible score).

Validity of the Performance Measure Score: Overview. The validity of the measure performance score was assessed using administrative claims compared with the gold standard of the medical record.

Conclusion. The ratio of MRI to CT derived from the gold standard of medical records (0.71) compared with the ratio of MRI to CT obtained solely from administrative claims (0.76) suggests that administrative claims have a high degree of validity. In addition, administrative claims are highly specific in respect to the exclusion criteria compared with the gold standard of medical records. Therefore, it is concluded that administrative claims alone can be used to calculate this measure.

Refer to the original measure documentation for additional information.

Evidence for Extent of Measure Testing

Quality Measurement, Evaluation, Testing, Review and Implementation Consortium (Q-METRIC). Basic measure information: ratio of magnetic resonance imaging scans to computed tomography scans for the evaluation of children with atraumatic headache. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2016 Jan. 57 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Ambulatory Procedure/Imaging Center

Emergency Department

Hospital Inpatient

Hospital Outpatient

Managed Care Plans

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Specified

Target Population Age

Age 4 to 17 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Safety

Data Collection for the Measure

Case Finding Period

The measurement year

Denominator Sampling Frame

Enrollees or beneficiaries

Denominator (Index) Event or Characteristic

Clinical Condition

Diagnostic Evaluation

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
The denominator is the number of computed tomography (CT) scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year.

Note:

Eligible children must be ages 4 through 17 years old during the measurement year for which imaging is obtained and must be continuously enrolled in their insurance plan during both the measurement year and the year prior.
Imaging may be obtained in any department of the hospital or at sites outside the hospital, such as free-standing imaging facilities and emergency departments. Each scan obtained on or within the 30 days after the date of evaluation for atraumatic headache is

the event used in the calculation. A list of codes for imaging studies of the head (CT) are shown in Table 1 of the original measure documentation. Codes to identify atraumatic headache are shown in Table 2 of the original measure documentation. Atraumatic headache must be diagnosed on the day of or up to 30 days prior to imaging. Atraumatic headaches are those not associated with trauma occurring in the past 7 days.

Exclusions

Exclusions based on International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes captured in administrative claims data:

- Trauma-related headache or pain (refer to Table 2 of the original measure documentation) on the day of or within the 7 days prior to imaging
- Head injury by related ICD-9-CM codes (refer to Table 3 of the original measure documentation) or by the presence of an E-code on the day of or within the 7 days prior to imaging
- Thunderclap headache (refer to Table 2 of the original measure documentation), on the day of or within 365 days prior to imaging
- Vascular disease (refer to Table 4 of the original measure documentation) on the day of or within 365 days prior to imaging
- Relative contraindications to magnetic resonance imaging (MRI) (refer to Table 5 of the original measure documentation) on the day of or within 365 days prior to imaging. (Note: Some contraindications are guidelines rather than strict rules. As such, a provider may determine that a child should undergo an MRI despite a contraindication.)

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions

The numerator is the number of magnetic resonance imaging (MRI) scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year.

Note:

Eligible children must be ages 4 through 17 years old during the measurement year for which imaging is obtained and must be continuously enrolled in their insurance plan during both the measurement year and the year prior.
Imaging may be obtained in any department of the hospital or at sites outside the hospital, such as free-standing imaging facilities and emergency departments. Each scan obtained on or within the 30 days after the date of evaluation for atraumatic headache is the event used in the calculation. Table 1 of the original measure documentation lists Current Procedural Terminology (CPT) codes associated with brain imaging (MRI). International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) codes to identify atraumatic headache are shown in Table 2 of the original measure documentation. Atraumatic headache must be diagnosed on the day of or up to 30 days prior to imaging. Atraumatic headaches are those not associated with trauma occurring in the past 7 days.

Exclusions

Exclusions based on ICD-9-CM codes captured in administrative claims data:

- Trauma-related headache or pain (refer to Table 2 of the original measure documentation) on the day of or within the 7 days prior to imaging
- Head injury by related ICD-9-CM codes (refer to Table 3 of the original measure documentation) or by the presence of an E-code on the day of or within the 7 days prior to imaging
- Thunderclap headache (refer to Table 2 of the original measure documentation), on the day of or within 365 days prior to imaging
- Vascular disease (refer to Table 4 of the original measure documentation) on the day of or within 365 days prior to imaging

Numerator Search Strategy

Fixed time period or point in time

Data Source

Administrative clinical data

Electronic health/medical record

Paper medical record

Type of Health State

Does not apply to this measure

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Ratio

Interpretation of Score

Desired value is a higher score

Allowance for Patient or Population Factors

not defined yet

Standard of Comparison

not defined yet

Identifying Information

Original Title

Ratio of magnetic resonance imaging scans to computed tomography scans for the evaluation of children with atraumatic headache.

Measure Collection Name

Overuse of Imaging for the Evaluation of Children with Headache or Seizures

Submitter

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) - Academic Affiliated Research Institute

Developer

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Funding Source(s)

This work was funded by the Agency for Healthcare Research and Quality (AHRQ) and the Centers for Medicare & Medicaid Services (CMS) under the Children's Health Insurance Program Reauthorization Act (CHIPRA) Pediatric Quality Measures Program Centers of Excellence grant number U18 HS020516.

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Financial Disclosures/Other Potential Conflicts of Interest

Unspecified

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2016 Jan

Measure Maintenance

Unspecified

Date of Next Anticipated Revision

Unspecified

Measure Status

This is the current release of the measure.

Measure Availability

Source available from the Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) Web site. Support documents also available from the Q-METRIC Web site.

For more information, contact Q-METRIC at 300 North Ingalls Street, Room 6C08, SPC 5456, Ann Arbor, MI 48109-5456; Phone: 734-232-0657.

NQMC Status

This NQMC summary was completed by ECRI Institute on May 9, 2016. The information was verified by the measure developer on June 29, 2016.

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Inform Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) if users implement the measures in their health care settings.

Production

Source(s)

Quality Measurement, Evaluation, Testing, Review and Implementation Consortium (Q-METRIC). Basic measure information: ratio of magnetic resonance imaging scans to computed tomography scans for the evaluation of children with atraumatic headache. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2016 Jan. 57 p.

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